

Notice of Allowability

Application No.

10/065,551

Examiner

Rodney G. McDonald

Applicant(s)

CHISTYAKOV, ROMAN

Art Unit

1753

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☐ This communication is responsive to _____.
2. ☒ The allowed claim(s) is/are 1-37.
3. ☒ The drawings filed on 29 October 2002 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

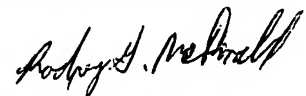
* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date 8/04; 12, 8, 7, 6/03
4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____.
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.


RODNEY G. MCDONALD
PRIMARY EXAMINER

REASONS FOR ALLOWANCE

The following is an examiner's statement of reasons for allowance:

Claims 1-14 are allowable over the prior art of record because the prior art of record does not teach an ionization source that generates a weakly-ionized plasma proximate to the cathode; a magnet that is positioned to generate a magnetic field proximate to the weakly-ionized plasma, the magnetic field substantially trapping electrons in the weakly-ionized plasma proximate to the cathode; a power supply that produces an electric field across the gap, the electric field generating excited atoms in the weakly-ionized plasma and generating secondary electrons from the cathode, the secondary electrons ionizing the excited atoms, thereby creating a strongly-ionized plasma comprising a plurality of ions; and a voltage supply that applies a bias voltage to a substrate that is positioned proximate to the cathode, the bias voltage causing ions in the plurality of ions to impact a surface of the substrate in a manner that causes etching of the surface of the substrate.

Claims 15-29 are allowable over the prior art of record because the prior art of record does not teach ionizing a feed gas to generate a weakly-ionized plasma proximate to a cathode; generating a magnetic field proximate to the weakly-ionized plasma, the magnetic field substantially trapping electrons in the weakly-ionized plasma proximate to the cathode; applying an electric field across the weakly-ionized plasma that excites atoms in the weakly-ionized plasma and that generates secondary electrons from the cathode, the secondary electrons ionizing the excited atoms, thereby creating a strongly-ionized plasma comprising a plurality of ions; and applying a bias voltage to a

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substrate that is positioned proximate to the cathode, the bias voltage causing ions in the plurality of ions to impact a surface of the substrate in a manner that causes etching of the surface of the substrate.

Claims 30-35 are allowable over the prior art of record because the prior art of record does not teach ionizing a volume of feed gas to form a weakly-ionized plasma proximate to a cathode; generating a magnetic field proximate to the weakly-ionized plasma, the magnetic field substantially trapping electrons in the weakly-ionized plasma proximate to the cathode; applying an electrical pulse across the weakly-ionized plasma to generate a strongly-ionized plasma comprising a first plurality of ions; exchanging the strongly-ionized plasma with a second volume of feed gas while applying the electrical pulse across the second volume of feed gas while applying the electrical pulse across the second volume of feed gas to generate a strongly-ionized plasma comprising a second plurality of ions; and applying a bias voltage to a substrate that is positioned proximate to the cathode, the bias voltage causing ions in the first and second plurality of ions to impact a surface of the substrate in a manner that causes etching of the surface of the substrate.

Claim 36 is allowable over the prior art of record because the prior art of record does not teach means for ionizing a feed gas to generate a weakly-ionized plasma proximate to a cathode; means for generating a magnetic field proximate to the weakly-ionized plasma, the magnetic field substantially trapping electrons in the weakly-ionized plasma proximate to the cathode; means for applying an electric field across the weakly-ionized plasma that excites atoms in the weakly-ionized plasma and that

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generates secondary electrons from the cathode, the secondary electrons ionizing the excited atoms, thereby creating a strongly-ionized plasma comprising a plurality of ions; and means for applying a bias voltage to a substrate that is positioned proximate to the cathode, the bias voltage causing ions in the plurality of ions to impact a surface of the substrate in a manner that causes etching of the surface of the substrate.

Claim 37 is allowable over the prior art of record because the prior art of record does not teach means for ionizing a volume of feed gas to form a weakly-ionized plasma proximate to a cathode; means for generating a magnetic field proximate to the weakly-ionized plasma, the magnetic field substantially trapping electrons in the weakly-ionized plasma proximate to the cathode; means for applying an electrical pulse across the weakly-ionized plasma to generate a strongly-ionized plasma comprising a first plurality of ions; means for exchanging the strongly-ionized plasma with a second volume of feed gas while applying the electrical pulse across the second volume of feed gas to generate a strongly-ionized plasma comprising a second plurality of ions; and means for applying a bias voltage to a substrate that is positioned proximate to the cathode, the bias voltage causing ions in the first and the second plurality of ions to impact a surface of the substrate in a manner that causes etching of the surface of the substrate.


Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rodney G. McDonald whose telephone number is 571-272-1340. The examiner can normally be reached on M- Th with Every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X. Nguyen can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Rodney G. McDonald
Primary Examiner
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RM
January 10, 2005